What is claimed is:

1. A plasma processing apparatus comprising:

a susceptor having an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing, and a focus ring having a contact portion disposed in contact with said electrostatic chuck;

wherein said focus ring has a dielectric material portion that forms said contact portion, and a conductive material portion that faces said electrostatic chuck with said dielectric material portion therebetween.

2. A plasma processing apparatus as claimed in claim 1, wherein said dielectric material portion has a constant thickness in a radial direction of said focus ring.

3. A plasma processing apparatus as claimed in claim 1, wherein said dielectric material portion is made of an oxide of a material constituting said conductive material portion.

4. A plasma processing apparatus as claimed in claim 1, wherein said material constituting said conductive material portion is silicon.

5. A plasma processing apparatus as claimed in claim 1, wherein said material constituting said dielectric material portion is silicon dioxide.

6. A focus ring having a contact portion to be disposed in contact with an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing, the focus ring comprising:

a dielectric material portion that forms said contact portion; and

a conductive material portion that faces said electrostatic chuck with said dielectric material portion

therebetween.

7. A susceptor comprising:

an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing; and

a focus ring having a contact portion disposed in contact with said electrostatic chuck;

wherein said focus ring has a dielectric material portion that forms said contact portion, and a conductive material portion that faces said electrostatic chuck with said dielectric material portion therebetween.

8. A plasma processing apparatus comprising:

a susceptor having an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing, and a focus ring having a contact surface disposed in contact with said electrostatic chuck around a periphery of the object to be processed; and

heat exchange means provided at said contact surface , for carrying out heat exchange with said focus ring.

9. A plasma processing apparatus as claimed in claim 8, wherein said heat exchange means comprises a groove provided in said contact surface and filled with a heat transfer medium.

10. A plasma processing apparatus as claimed in claim 9, wherein said heat transfer medium is a Galden fluid.

11. A plasma processing apparatus as claimed in claim 9, wherein said groove is formed in said focus ring.

12. A plasma processing apparatus as claimed in claim 9, wherein said groove is formed in said electrostatic chuck.

13. A plasma processing apparatus as claimed in claim 9, wherein said groove has a depth of not less than

0.1mm.

14. A plasma processing apparatus as claimed in claim 9, wherein said groove has corners thereof rounded off.

15. A plasma processing apparatus as claimed in claim 9, wherein said groove comprises at least one groove having an annular shape concentric with said focus ring.

16. A plasma processing apparatus as claimed in claim 8, wherein said heat exchange means comprises cooling means for cooling said focus ring.

17. A plasma processing apparatus as claimed in claim 16, wherein said heat exchange means comprises a supply path that supplies a heat transfer gas to said contact surface, the plasma processing apparatus further comprising a controller that controls a pressure of the heat transfer gas supplied from said heat exchange means, and wherein the plasma processing comprises a plurality of steps, and said controller changes the pressure of the heat transfer gas supplied in accordance with each of the steps.

18. A plasma processing apparatus as claimed in claim 16, further comprising an electrode built into said electrostatic chuck in a manner facing said focus ring, and a controller that controls a voltage applied to said electrode, wherein said electrode attracts said focus ring to said electrostatic chuck by electrostatic attraction, the plasma processing comprises a plurality of steps, and said controller changes the voltage applied to said electrode in accordance with each of the steps.

19. A plasma processing apparatus as claimed in claim 16, wherein said heat exchange means reduces a temperature of said focus ring to at least 20K below a temperature of said electrostatic chuck.

20. A plasma processing apparatus as claimed in

claim 19, wherein said heat exchange means reduces the temperature of said focus ring to not more than 0°C.

21. A plasma processing apparatus as claimed in claim 16, wherein said heat exchange means comprises heating means for heating said focus ring.

22. A plasma processing apparatus as claimed in claim 16, wherein said focus ring further comprises second heating means for heating said focus ring.

23. A plasma processing apparatus as claimed in claim 16, wherein said focus ring is exposed to a cleaning gas.

24. A plasma processing apparatus as claimed in claim 16, wherein said focus ring is exposed to a plasma.

25. A plasma processing apparatus as claimed in claim 8, wherein said heat exchange means comprises a Peltier device.

26. A focus ring having a contact surface to be disposed in contact with an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing, around a periphery of the object to be processed, the focus ring comprising:

heat exchange means provided at said contact surface , for carrying out heat exchange with said focus ring.

27. A susceptor comprising:

an electrostatic chuck on which is mounted an object to be processed that is to be subjected to plasma processing;

a focus ring having a contact surface disposed in contact with said electrostatic chuck around a periphery of the object to be processed; and

heat exchange means provided at said contact surface , for carrying out heat exchange with said focus ring.